State of California

Child Welfare Services/Case Management System

Windows 2000 Workstation Architecture

March 29, 2004

Version 3.0

Preface

The CWS/CMS Architecture Group produced this document. Listed below are related documents that contain additional and specific information not covered in this document.

Document Name	Deliverable
CWS/CMS Infrastructure Architecture (Version 1.0)	WA0005A - 2
Windows 2000 Server Architecture (Version 2.3)	WA0005A - 3
Windows 2000 Workstation Proof of Concept	WA0006A - 3
Windows 2000 Minimum Workstation Requirements Recommendation	WA0007 – A1
CWS/CMS System Architecture	W2303 – C02
CWS/CMS IP Migration Architecture	WA9805 – A1
MEDS Terminal Emulation Design Specifications	W2303 – C02
LIS Interface Design Specifications	W2303 – C02
Case Data System (CDS) Design Specification	W2303 – C02
CWS/CMS Exchange Architecture (Version 1.1)	WA9814 – A1
Domain Enterprise Administrator - User Documentation	n/a
Define, Analyze and Recommend Technical Enhancements to the CWS/CMS Application and Infrastructure	WA9719 – A1
Network Auto-Installer Program - Technical Guide	WA9804 – A8
Coexistent County Print Services (Version 1.1b)	n/a
Windows 2000 Workstation Recovery Guide (Version 1.22)	WA0006 – C3
CWS/CMS Dialup and ASA Architecture (Version 3.01)	n/a
CWS/CMS CAD Architecture (Version 1.0)	n/a
PCAT V3.1 Install for Win2k VPN Upgrade	n/a
CWS/CMS Application Architecture (Dated 6/1/2001)	WA0007

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1 Introduction

1.1 Purpose

This document has been prepared in response to a request by the State of California to document the updates to the Child Welfare Services/Case Management System (CWS/CMS) resulting from the execution of system change requests (SCR's) with the implementation of Microsoft Windows 2000 as the workstation operating system for CWS/CMS users. The CWS/CMS Project began in 1992 and was developed using information and technology existing at that time; since then, improvements in technology have been incorporated into the CWS/CMS implementation.

This document provides a technical review of the CWS/CMS Project's Windows 2000 Workstation Architecture. It presents a high-level overview of the CWS/CMS requirements and addresses how the Windows 2000 workstation architecture is implemented to meet the needs of the project. Only general descriptions of software and hardware products being used with this project are provided in this document[1].

- This document represents a snapshot of the Workstation Architecture at the time of this document's publication.

This document will be updated as required by contract or when work orders change the CWS/CMS Workstation Architecture.

Future changes to this document will be reflected in the appendices, which contain technical information relating to the software and hardware used in the CWS/CMS Workstation Architecture.

1.2 Organization

The document is organized to take the reader sequentially through the design of the current Workstation Architecture, and it covers the following:

Section 2. **CWS/CMS Environment Preview** – Describes the application and system services incorporated into the CWS/CMS enterprise architecture.

Section 3. **CWS/CMS Workstation Overview** – Describes the basic State workstation requirements that meet the needs of Child Welfare Services and their clients. Identification of software and hardware requirements is included.

Section 4. **CWS/CMS Workstation Architecture** – Describes the system services and applications software. This chapter identifies the software chosen to fulfill the CWS/CMS requirements as described in *Section 3*.

[1] There are User Guides and technical documents, (some of which are project deliverables) that provide workstation software and hardware specifics that are not detailed in this document.

Section 5. **CWS/CMS Hardware Components** – Describes the workstation components and associated configurations necessary to operate the system services and applications software identified in *Section 4*.

Sections 2 and *3* of this document are designed to give the reader a high-level overview of the CWS/CMS Project. These sections give the reader introductory information identifying the scope and goals of the CWS/CMS project implementation. An in-depth discussion of workstation software and hardware components has been omitted from these sections, as the following sections (*Sections 4* and *5*) provide more detailed information about specific workstation functionality and the components associated with specific workstation services.

Sections 4 and *5* present details of the workstation architecture and address the software and hardware components used to meet the requirements of the CWS/CMS Project. These sections provide the reader with an understanding of the components used to build a CWS/CMS workstation. The technical information presented is sufficient to provide a Microsoft Certified Systems Engineer (MCSE) with the information necessary to create step-by-step instructions for building a workstation configuration.

1.3 Intended Audience

This document is presented for two levels of Information Service personnel:

- Managers and personnel in lead positions
- Technical implementation personnel

Sections 2 and *3* of this document are intended for Information Services Managers and people in managerial positions related to the technology used by the State of California Child Welfare Services. The technical terminology used is sufficient to cover an overview of the Workstation Architecture, but it does not require significant experience in the management of such systems. *Appendix 1* is a glossary that will assist readers with some of the more technical terms used in the document.

Sections 4 and *5* of this document are intended to provide technical implementation personnel with the information necessary to build the processes and procedures required to implement a Windows 2000 workstation for the CWS/CMS environment. *Appendix 2* provides the application-specific configuration options used to build the CWS/CMS workstations.

2 CWS/CMS Environment Preview

2.1 Overview

The purpose of this chapter is to identify the application and systems architectures used to create the CWS/CMS enterprise environment. This chapter is written to provide a high-level overview of the component architectures[2] comprising the CWS/CMS implementation. This overview is presented in two ways. *Sections 2.1*, *2.2* and *2.3* are descriptions of the Operating Environment and Network Organization and are designed to provide an understanding of the relationship between systems and resources in the system-wide configuration. *Sections 2.4* and *2.5* focus more on the logical aspects of the implementation and identifies the relationships between hardware and services. *Table 2-1* below identifies each of these component architectures.

Architecture	Component Services	Type
TCP/IP Implementation	DHCP, DNS, WINS	Service
Forest / Domain	Windows 2000 Active Directory, Windows NT Domain	Service
CWS/CMS Case Management	CWS/CMS Application, DB2 (Data Store), CICS	Service
External Interfaces	3270 Emulation Gateway Services	Service
Electronic Messaging	Mail Messaging, Internet Mail Service, EDSS	Service
Web Access	Proxy Services, Web Services	Service
Remote Access	Dial-up Services	Service
Alternate Server Access	Dial-up Services	Service
Print	Windows 2000 Print Services	Service
User Presentation	CWS/CMS Application, Office 97 Standard, Outlook 98, 3270 Emulation	Service
Software Distribution	Logon Scripts, NAP2K	Service
County Access to Data and Reports	County Access to Data (CAD)	Service
Security	NTFS, User Authentication	Service

[2] These component architectures are described in detail in the *Windows 2000 Infrastructure Architecture* document (Project deliverable WA0005A – 2).

Architecture	Component Services	Type
Wide Area Network	Protocol Support	Infrastructure
Local Area Network	Topology Design, Network Management	Infrastructure
Server	Domain, Communications, Backup, Print, Software Distribution, Management	Infrastructure
Workstation	Desktop, Laptop	Infrastructure

Table 2-1 – List of Application and System Services

2.2 Operating Environment

Traditional networks were a collection of relatively autonomous inter-networked local area networks (LANs) largely defined by geographical location. A tacit assumption in such a configuration was that 80 percent of the data traffic would remain within each workgroup LAN. In the past, internetworking among the workgroups primarily supported e-mail, file transfer, and remote logon to host applications. With the proliferation of today's wide area and any-to-any intranet traffic, the 80/20 formula no longer holds true. When it comes to matching the way governmental entities actually do business, Client/Server, enterprise-wide computing architectures are an improvement on traditional LAN-based networking.

The CWS/CMS network environment is accurately characterized as complex. This complexity is the natural result of the multi-tiered functionality of the CWS/CMS applications system, which is designed to provide application services statewide and to 58 separate and distinct counties, with each county having an independent networking environment.

The key to the effective implementation of the CWS/CMS client presentation suite of applications (see *Table 3.1*) is ensuring their ability to function across different operating environments. *Section 2.4* provides a graphic view of this environment, which will assist readers in understanding its layout. *Section 2.5* provides a brief summary about the key components associated with the application's operating environment.

2.3 CWS/CMS Service Organizations

At the highest level, CWS/CMS network services break down into the following key service organizations:

- Health and Human Services Data Center Wide Area Network (HHSDC WAN)
- Central Data Processing Facility (CDPF)
- Central Sacramento Server Facility (CSSF)
- HHDSC Cannery Facility
- AT&T Network Services Dial-up Network
- County Infrastructures

2.3.1 HHSDC Wide Area Network

The Health and Human Services Data Center (HHSDC) administers the WAN required for the management and implementation of specific statewide health and welfare programs. The HHSDC WAN serves as the CWS/CMS Project's communications hub between the workstations and the county case management data. The HHSDC WAN has a statewide infrastructure with over 60,000 devices defined to its network, and it services more than 60 networks from multiple organizations.

2.3.2 Central Data Processing Facility (CDPF)

The CDPF is located at IBM in Boulder, Colorado, and provides the IBM host mainframe operations, server management, network support, and customer service (help desk) for CWS/CMS users. This facility houses the system mainframe host computer and communications controller, as well as a Local Area Network (LAN) that attaches the administrative workstations and servers. The mainframe host computer holds the shared statewide CWS/CMS database repository for records maintained by the CWS/CMS Project and that are accessible to CWS/CMS users. The CDPF provides 24/7, system-wide network administration, maintenance, and help desk services.

2.3.3 Central Sacramento Server Facility (CSSF)

This Central Sacramento Server Facility is located in Sacramento, California and serves as a central facility for a collection of Windows NT servers installed with Microsoft's Exchange Server messaging services and for the CWS/CMS County Access to Data (CAD) database Server. The Exchange servers provide e-mail, scheduling, and other collaborative services to most of the CWS/CMS dedicated counties and some of the coexistent counties. The CAD database gives specific CWS/CMS users access to ad hoc reporting capability that allows them to perform quality assurance functions for the review of case data timeliness, completeness, and compliance with Federal and State policies and standards.

2.3.4 HHSDC Cannery Facility

The HHSDC Cannery Facility is located in Sacramento, California and serves as the support center for the HHSDC WAN. This facility provides 24/7 system-wide network administration, maintenance, and help desk services associated with the HHSDC WAN. The HHSDC Cannery also houses the Medi-Cal Eligibility Data System (MEDS) and Licensing Information System (LIS) data systems accessed by CWS/CMS users.

2.3.5 AT&T Network Services Dial-Up Network

AT&T Network Services provides a secure network service with dial-up capabilities that permit CWS/CMS users to access CWS/CMS Applications from remote locations. Remote access is available to users by either a local access number or an 800 number. This service provides mobile CWS/CMS users with remote access to the CWS/CMS Application.

2.3.6 County Infrastructures

Each CWS/CMS client county has unique characteristics that are based on local network conditions and network topologies having different physical conditions and other variables.

County infrastructures are classified as either “dedicated” or “coexistent, “depending on the CWS/CMS Project’s involvement in the LAN.

2.3.6.1 Dedicated Counties

Dedicated counties entered into an agreement under which IBM Global Services is designated to be the agency responsible for the installation and maintenance of CWS/CMS Applications and the related operating hardware and software.

2.3.6.2 Coexistent Counties

Coexistent counties agreed to use the CWS/CMS client presentation suite of applications, but they still retain the responsibility for the maintenance of related operating hardware used by the CWS/CMS Application network infrastructure.

2.4 CWS/CMS Network Topology

The CWS/CMS enterprise network services all fifty-eight (58) California counties, the Central Data Processing Facility, the Central Sacramento Server Facility, the CWS/CMS Project Office, and the California Department of Social Services (CDSS). *Figure 2-1* provides a visual representation of the CWS/CMS network after the completion of the Project’s technological refresh in early 1999, and it identifies several of the previously referenced service organizations. These include: the AT&T Network Services dial-up network providing dial-up remote access; the Central Data Processing Facility providing centralized data storage, remote network support; the Central Sacramento Server Facility; the HHSDC Cannery facility; and the County environment infrastructures. Dedicated county networks have a standard structural topology designed, installed, and maintained by the Project. Coexistent county networks are subject to county standardization with the county responsible for design, installation, and maintenance of their LAN’s and MAN’s.

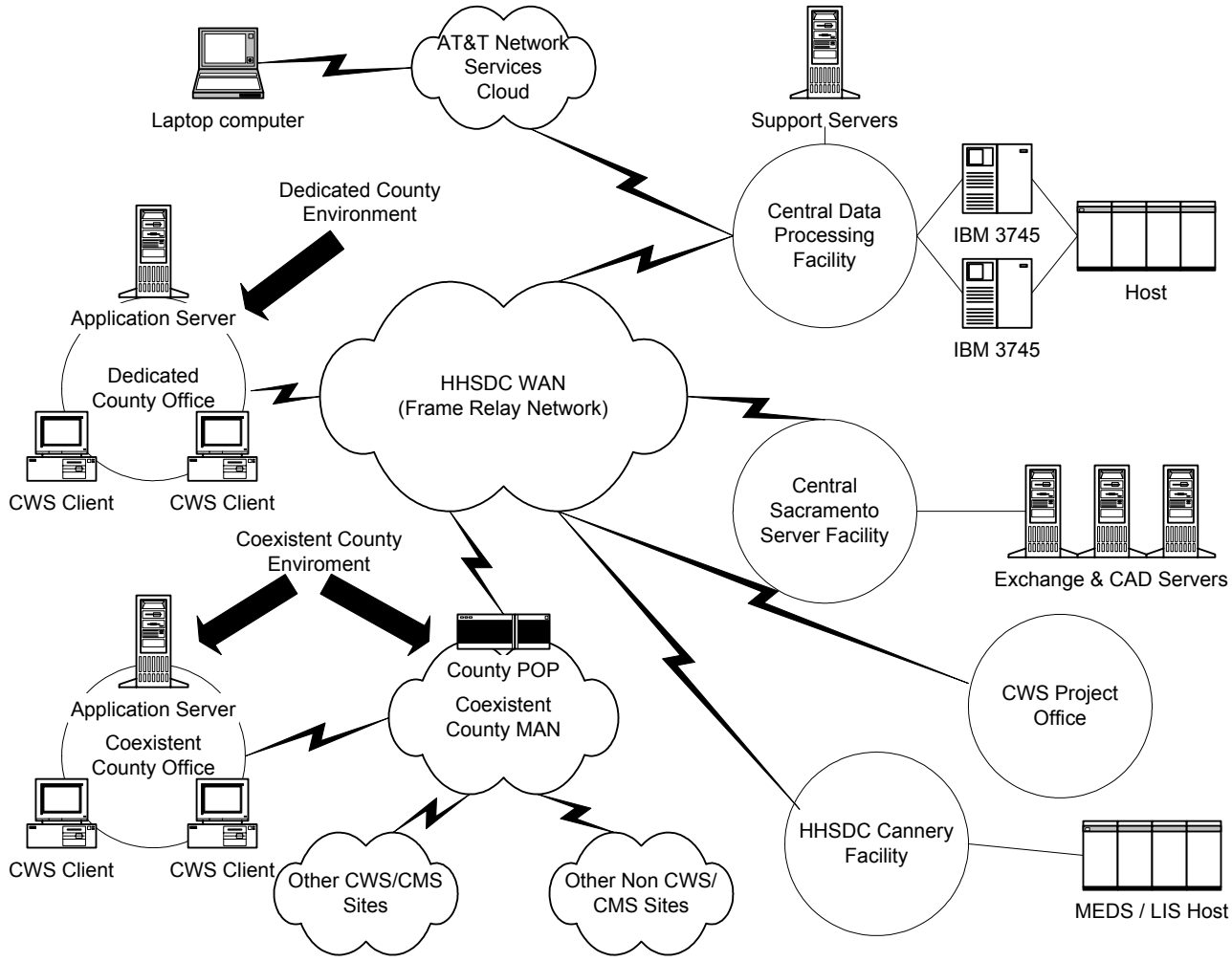

Figure 2-1 – Overview of the CWS/CMS Networks Operating Environment

2.5 Service Architecture Overview

An overall understanding of the CWS/CMS infrastructure is enhanced by viewing it from a service perspective, a view that provides a logical basis for understanding the interactions among the various systems and subsystems. This perspective explains the rationale behind locating physical devices in specific locations.

Figure 2-2 shows the CWS/CMS Services Logical Framework Model, and is a visual representation of the tiered logical placement of services in the CWS/CMS Application infrastructure. Traditionally, the WAN, MAN, and LAN are represented with distinct geographical boundaries, but the wide range of CWS/CMS county and office sizes can obscure this delineation, as represented by the expansion of the LAN boundaries.

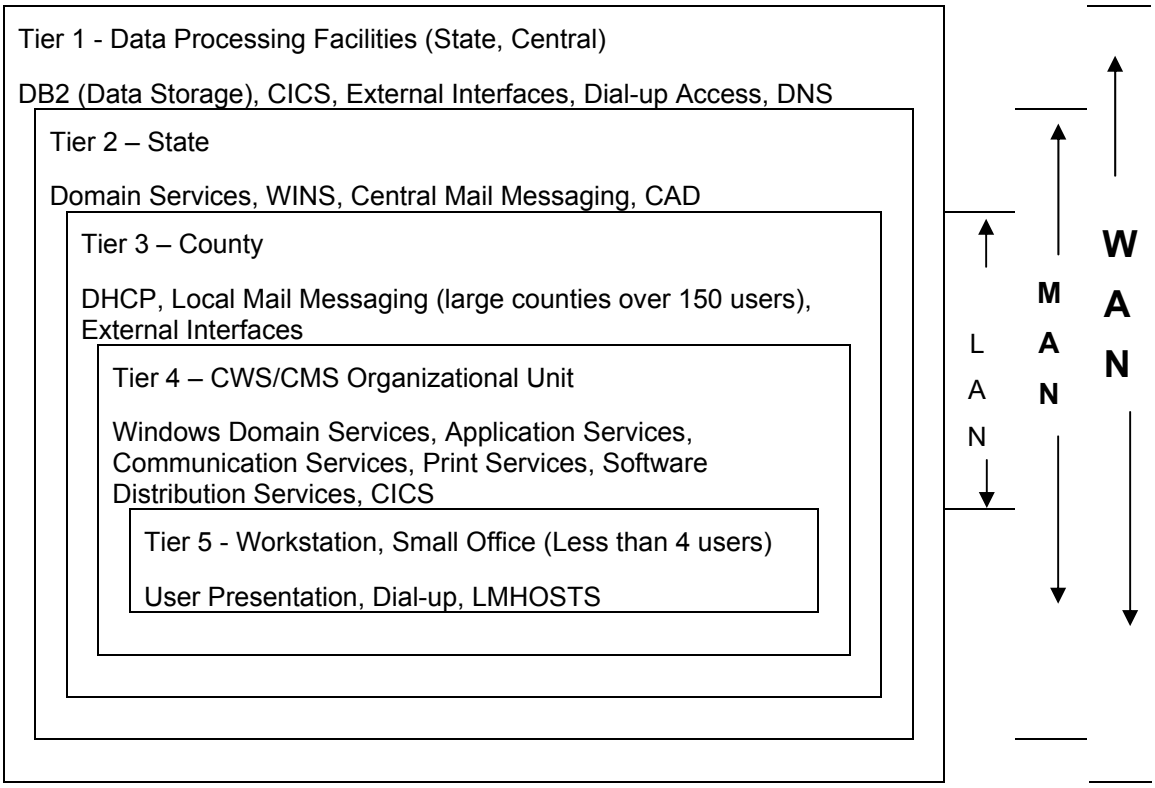

Figure 2-2 – CWS/CMS Services Logical Framework Model

This tiered logical framework model is designed to identify the service delivery methodology required to provide CWS/CMS Application services.

Tier 1 – Data Processing Services (State, Central)

Tier 1 services are provided globally to the entire State of California. Services provided by the HHSDC WAN and the CDPF include--but are not limited to--data storage and retrieval, DNS, domain replication, access to external data systems, and the dial-up services provided to remote users accessing the CWS/CMS System. Note that the Windows 2000 Directory Service is added at the Tier 1, Tier 3, and Tier 4 levels, which allows for individual customization of Directory Services at each tier.

Tier 2 – State Services

Tier 2 services include the Domain Services for Windows 2000 and Windows NT, the State WINS service, and the State's electronic messaging service (Exchange). Tier 2 components are delivered at the state level, but may not be used in all counties.

The electronic messaging architecture is designed to provide messaging services for all but the largest counties, in which an Exchange Server is located within the individual county's LAN. Although physically dispersed, these servers remain part of a single Exchange domain.

Tier 3 – County Services

Tier 3 designates county-specific services required for the CWS/CMS implementation and includes access to external interfaces and mail messaging, if appropriate. Active Directory provides DNS name resolution, domain authentication, and domain replication services. Windows 2000 Domain services are implemented at this tier. Coexistent county MANs would also be included at this tier.

Tier 4 –CWS/CWS Organization Unit

The Tier 4 application domain provides the infrastructure for user access to the services in Tiers 1, 2, and 3. A domain controller is used as a central security database, providing administration to the county domain and authentication of user IDs for access to CWS/CMS Application resources. CWS/CMS communication services provide access to the CWS/CMS Application database, and the location of these services is designed to provide users with prompt network logon and access to the CWS/CMS Applications. DHCP, and Windows 2000 Integrated DNS services that are implemented in this tier. Tier 4 locations also provide user access to print and external interface services.

Tier 5 – Workstation Services

The Tier 5 designation includes two classes of workstations. Workstations participating in a Tier 4 domain would be associated with the Tier 5 designation. Offices with less than four (4) workstations are configured without an on-site CWS/CMS Application server and must use the services of a Tier 4 domain. Architecture components provided at this tier include client presentation and workstation infrastructure.

3 CWS/CMS Workstation Overview

This section identifies the application and systems components used to create the CWS/CMS Workstation Architecture. This section is written to provide a high-level overview of the service requirements of CWS/CMS, the software and hardware components comprising the CWS/CMS user interface, and the components used to address the service requirements. The workstation overview is designed to inform the reader of the minimum required software and hardware specifications for the CWS/CMS workstations. These products meet the minimum specification requirements for the CWS/CMS workstation and may be updated in the future to reflect the latest products available on the market.

3.1 Service Requirements

A number of requirements have been established through the Base Contract between IBM and the State of California, contract amendments, or from Work Authorizations. A high-level overview of these requirements, along with the contract vehicle, is listed in *Table 3.1* below.

Table 3-1 details the Windows 2000 workstation software required to support the CWS/CMS client presentation suite in a network-attached configuration. It includes the supporting workstation architectures and component services used to address the specified requirements.

Service Requirement	Contract Vehicle	Architecture	Component Services
Windows 2000 Operating System	WA0006	Client Presentation	Operating System
CWS/CMS Application	Base Contract Agreement #31091	Client Presentation	CWS/CMS Application
Document Creation and Editing	Base Contract	Client Presentation	Word Processing
Electronic Messaging	Base Contract and WA9804	Client Presentation	E-Mail Client
3270 Interfaces for access to: ▪ MEDS ▪ LIS ▪ CDS	Base Contract	Client Presentation	3270 Emulation
Statistical Reporting – SAS[3]	Amendment 20, Section 71	Client Presentation	3270 Emulation

[3] There are currently only 22 SAS users limited to the following counties/agencies: Alameda, Monterey, Riverside, Sacramento, Santa Clara, CDSS, and HHSDC.

Service Requirement	Contract Vehicle	Architecture	Component Services
Spreadsheet	WA9804	Client Presentation	Office Productivity Suite
Web Services	WA9805	Client Presentation	Network Browser Services
Web Services – PDF Document Reader	WA0001	Client Presentation	Web Services Access
Remote Access	Amendment 2 and WA9310	Client Presentation	AT&T Global Dialer
Application Help and Notification	SOW0019	Client Presentation	Application Help Services
Computer-Based Training	SOW0019	Client Presentation	CWS/CMS Training Services
Scenario Manager	SOW0019	Client Presentation	CWS/CMS Training Services
Web-Based Training	SOW0019	Client Presentation	Web Services Access
ADHOC Reporting	WA0003	Client Presentation	County Access to Data
Virus Recognition and Eradication	Base Contract	Workstation Infrastructure	Antivirus Service
Software Updates	Base Contract	Workstation Infrastructure	Software Distribution Service
Workstation Shadowing	Base Contract	Workstation Infrastructure	Workstation Management
Workstation Recovery	Base Contract	Workstation Infrastructure	Workstation Recovery Service
Network Connectivity	Base Contract, WA0005A, and WA0005B	Workstation Infrastructure	Network Services Interface
Network Operating System	WA0006	External Infrastructure	Network Services
Print Services	Base Contract	External Infrastructure	File and Print Services Interface
Shared Drive Access	WA9902	External Infrastructure	File and Print Services Interface

Table 3-1 – CWS/CMS Workstation Requirements and Architecture Components

3.2 Workstation Software Preview

CWS/CMS uses a variety of client-based desktop and laptop (notebook) computers. Each of these computers is configured to use the Microsoft Windows 2000 operating system.

Table 3-2 identifies the software application requirements of a Windows 2000 workstation running the CWS/CMS client presentation suite. Descriptions of these applications are presented in Section 4.

Component Services	Application	Requirement
Operating System	Windows 2000	Required
CWS/CMS Application	CWS/CMS Application	Required
Word Processing	Word 97	Required
E-Mail Client	Outlook 98	Optional in Coexistent Counties
3270 Emulation	IBM Personal Communications	Optional in Coexistent Counties
Office Productivity Suite	Office 97 Standard– Excel 97, PowerPoint 97	Optional in Coexistent Counties
Network Browser	Internet Explorer	Optional in Coexistent Counties
AT&T Network Services	AT&T Global Dialer	Optional in Coexistent Counties
Application Help Services	CWS/CMS On-Line Release Notes	Optional
CWS/CMS Training Services	Computer-Based Training	Optional
CWS/CMS Web Services	• Adobe Acrobat Reader • Web-Based Training • xTools	Optional in Coexistent Counties Optional Optional
County Access to Data	Business Objects SafeNet VPN DB2 CAE	Optional
Antivirus Services	Norton Antivirus	Optional in Coexistent Counties
Software Distribution Service	• Login Scripting • CWS File Transfer • Network Auto-installer	Optional in Coexistent Counties Required Optional in Coexistent Counties

Component Services	Application	Requirement
	Program	
Workstation Management	IBM Director	Optional in Coexistent Counties
Workstation Recovery Service	Power Quest's Drive Image Pro	Optional in Coexistent Counties
Network Services Interface	Windows 2000 Workstation • TCP/IP Protocol Stack • CICS Universal Client Name Resolution	 Required Required
Network Services	Windows 2000 Workstation • DHCP Support-Name resolution • DNS Support • WINS Support	 Optional in Coexistent Counties Required Optional in Coexistent Counties
File and Print Services Interface	Windows 2000 Workstation File and Print Services	Print Services Optional in Coexistent Counties Shared File Services not supported in Coexistent Counties

Table 3-2 – CWS/CMS Workstation Software Requirements Summary

3.3 Workstation Hardware Preview

This section identifies the minimum workstation hardware requirements for a workstation that will run on a Windows 2000 operating system and support the current performance objectives of the CWS/CMS Application. It does not take into consideration future hardware considerations beyond the current release of the CWS/CMS Application. The minimum specifications identified are applicable to workstations operational in the dedicated county environment. Applications unique to coexistent counties will require additional consideration and are the responsibility of the coexistent county to assess.

The CWS/CMS Application supports two workstation configurations. The first configuration is the standard desktop client used in the networked environment (with optional dial-up services for Alternate Server Access). The second configuration is the laptop client used in both the networked and dial-up environments.

3.3.1 Minimum Desktop Workstation Specifications

The CWS/CMS desktop workstation specifications will support CWS/CMS client/server applications for use within the State of California in both LAN-attached and dial-up (ASA) modes.

The specifications outlined in *Table 3-3* identify the minimum desktop configuration required to support the CWS/CMS client presentation suite on Windows 2000 desktop workstations operational in dedicated counties.

Sub-Component	Specification	Requirement
Processor	400-MHz Pentium-Based or Equivalent	Minimum
Memory	128 MB	Minimum
Video	SVGA mode support (800 x 600 x 16bit)	Minimum
Fixed Storage	6 GB	Minimum
Removable Storage	3 ½ inch 1.44 MB Floppy Disk Drive CD-ROM	Required
NIC	Ethernet 10/100 Adapter w/Wake on LAN	Minimum
Modem (Required for ASA)	US Robotics compatible 28.8 KBps	Minimum
Sound	Sound Blaster Compatible	Optional
Multi I/O Interfaces	• Universal Serial Bus Port (USB) • Serial Interface • ECP/EPP Parallel Interface	Optional
Keyboard	101-key enhanced keyboard	Required
Mouse	Microsoft or PS/2 Compatible	Required
Monitor	15 inch SVGA support (800 x 600 x 16bit)	Minimum

Table 3-3 – Minimum Desktop Workstation Specification

3.3.2 Minimum Laptop Workstation Specifications

The CWS/CMS laptop workstation specifications will support CWS/CMS client/server applications for use within the State of California in both LAN-attached and dial-up modes.

The specifications outlined in Table 3-4 identify the minimum laptop configuration required to support the CWS/CMS client presentation suite on Windows 2000-configured laptop workstations operational in dedicated counties.

Sub-Component	Specification	Requirement
Processor	Pentium 450-MHz Intel CPU or Equivalent	Minimum
Memory	128 MB	Minimum
Video	SVGA mode support (800 x 600 x 16bit)	Minimum
Fixed Storage	6 GB	Minimum
Removable Storage	3 ½ inch 1.44 MB Floppy Disk Drive CD-ROM	Required
NIC	Ethernet 10/100 Network Adapter	Minimum
Modem	Data/Fax Modem –28.8 kb (minimum)	Minimum
Sound	Sound Blaster Compatible	Optional
Multi I/O Interfaces	• Universal Serial Bus Port (USB) • Serial Interface • ECP/EPP Parallel Interface	Optional
Keyboard	Enhanced QWERTY keyboard with 12 function keys	Minimum
Pointing Device	Mouse or TrackPoint	Required
Color display	15 inch SVGA support (800 x 600 x 16bit)	Minimum

Table 3-4 – Minimum Laptop Workstation Specification

3.3.3 Limitation to Project-Procured Workstations

Each workstation provided by the Project undergoes extensive quality assurance testing to ensure compatibility with the existing architecture and the CWS/CMS client presentation suite[4].

[4] The application testing methodology is described in detail in the *Windows 2000 Minimum Workstation Requirements Recommendation* document (Project deliverable WA0005A – 2).

This testing ensures that all components and appropriate drivers are identified and integrated into the support processes of the Project's management procedures. Workstation configurations not subjected to the quality assurance testing will not be integrated into the support processes. A list of Project supported workstations and configurations can be found in *Appendix A* of the *Windows 2000 Workstation Recovery* document.

3.3.4 Application Integration

Project-supported software applications (described in *Appendix 2*.) are tested for compatibility with the Windows 2000 operating system. Non-supported software applications loaded on the workstation are not considered by the Project and are the responsibility of the county to validate Windows 2000 compatibility.

The CWS/CMS Application is tested for compatibility with the dedicated county workstation image. Coexistent counties are responsible to verify the CWS/CMS Application functions with non-Project-supported applications loaded on the workstation.

4 CWS/CMS Workstation Architecture

The CWS/CMS workstation participates in the CWS/CMS environment at Tier 5 of the CWS/CMS Logical Framework Model (see *Section 2.5*). The CWS/CMS Workstation Architecture is composed of three sub-architectures. These sub-architectures are identified as follows:

1. Client Presentation Services
2. Workstation Infrastructure Services
3. External Infrastructure Services

For the purposes of this section, a brief description of workstation applications and services is presented. A detailed description of the applications and services is available through each product's respective User Guides. Specifications for selected options and configurations applicable to the dedicated county environment can be found in *Appendix 2*.

Hardware is discussed in its own section and is selected largely based on its ability to support the chosen applications within acceptable performance ratings.

4.1 Client Presentation Suite

The CWS/CMS Client Presentation Applications are designed to provide the user with a graphical user interface (GUI) enabling users to intuitively access CWS/CMS Application functions. Key functions associated with these applications include:

- The ability to view database information and documentation
- The ability to input and manipulate data
- The ability to create and update documentation
- The ability to perform other functions associated with the creation, update, and management of information used by the CWS/CMS Applications

Dedicated counties may implement only the Project-sponsored client presentation suite.

Coexistent counties may elect to modify the services available to the user. Coexistent counties are responsible for determining any additional service requirements beyond the CWS/CMS client presentation suite. If required, coexistent counties will be responsible for providing any additional services using county-owned and managed infrastructure.

4.1.1 Operating System

The CWS/CMS client presentation suite was originally developed using the Windows 3.11 presentation GUI. Prior to its initial deployment, the application was ported to the Windows 95 operating system that, until the deployment of Windows 2000, was the only operating system supported by the CWS/CMS client presentation suite. While this architecture document focuses on the Windows 2000 operating system, a brief statement of Windows 95 is presented to identify the transition effort to the Windows 2000 operating system platform.

4.1.1.1 Windows 95

Microsoft Windows 95 was initially chosen because it is a stable 32-Bit Windows-based operating system that is affordable, easy to use, and easy to develop for. It also met the network connectivity requirements of the application and processes relative to the needs of the State and counties, with many connectivity features built into the operating system. Additionally, it supports multiple login platforms, including OS/2, Windows NT 4.0, Windows 2000, and Novell (which is used in various Coexistent Counties). However, Microsoft stopped support for Windows 95 after January 1, 2001; therefore, it is being phased out of the CWS/CMS Project.

4.1.1.2 Windows 2000

As of January 2000, Microsoft's supported business-based operating system is Windows 2000. The CWS/CMS Project chose Windows 2000 to replace Windows 95 on all client workstations statewide to take advantage of Microsoft's troubleshooting support, increased stability, and security, and because Windows 2000 supports several additional features needed for the project.

4.1.1.3 Windows 95 to Windows 2000 Transition

The release of Version 5.0 of the CWS/CMS Application provided support for two separate operating systems, and it is written to execute on Microsoft's Windows 95 or Windows 2000 platform. With the inclusion of a new network infrastructure (Windows 2000 Servers), the Windows 2000 workstation platform is available for the production environment. New workstations delivered to the field will be installed with the Windows 2000 operating system. Workstations meeting CWS/CMS Windows 2000's architectural requirements will be migrated to the Windows 2000 platform. The remaining workstations operating with Windows 95 will be replaced through attrition.

4.1.1.4 County Participation Options

The State is currently migrating all CWS/CMS workstations from the Windows 95 operating system to the Windows 2000 operating system. At the completion of this migration, Microsoft's Windows 2000 operating system will be the only available CWS/CMS-supported operating system compatible with the CWS/CMS Application, and will be required for all CWS/CMS users in all counties.

4.1.2 CWS/CMS Application

CWS/CMS Application programs are customized programs developed by the Project so county and State workers can perform required CWS/CMS functions. Some application programs operate independently of commercial off-the-shelf (COTS) software products, while others exploit the products to provide broader capabilities. For purposes of this discussion, a function fully supported by standard COTS software (such as inquiring into an external LIS system using PCOM or sending a message using Microsoft Exchange), is a component of the CWS/CMS client presentation suite, but is not considered a CWS/CMS Application program.

The CWS/CMS Application programs are described in detail in the following documents:

- Caseload and Client Services
- Resource Management

- Fingerprint

Please consult the CWS/CMS Document Deliverables library for a complete list of CWS/CMS Application documentation.

4.1.2.1 Main Application

The CWS/CMS Application is written specifically to provide the services listed in the table below. While several COTS applications help provide these services, most of the application is custom-developed.

Function	**Description**
Intake	Referral screening, investigation, and cross reporting
Client Information	Recording and accessing information about clients
Service Delivery	Recording of services delivered to clients
Case Management	Development of case plans, monitoring service delivery, and progress assessment
Placement	Placement management and matching of children to placement alternatives
Court Processing	Hearing preparation; filing of petitions; generating subpoenas, citations, and notices; and recording court actions
Caseload	Assignment and transfer of cases
Resource Management	Information about resources available for CWS/CMS (services providers, county staff resources, etc.)
Fingerprint	Information from criminal history clearances
Program Management	Caseload, county, and program-level information for program management purposes
Adoptions	Recording of information for reporting purposes
Licensing	Information about licensees used in placement decisions

Table 4.1 – CWS/CMS Application Service Modules

The specifics about how each of these functions operates are not covered in this document. However, when building workstations and trying to provide the services that allow the application to work correctly, there needs to be an awareness of how the CWS/CMS Application interacts with the workstation and the CWS/CMS infrastructure environment.

4.1.2.2 County Participation Options

The CWS/CMS Application is a required application for CWS/CMS users in all counties. Due to the changing nature of the CWS/CMS Application, it is not installed as part of the base CWS/CMS dedicated county image.

4.1.3 Word Processing

The CWS/CMS Application creates many forms and records for official use. To standardize these documents (and because the word-processing software and printer driver can significantly impact the appearance of a document), a single word-processing software and a standard printer driver is utilized. The CWS/CMS Application was developed to integrate with Microsoft Word 97, which is called directly by the CWS/CMS Application and has direct software integration services built-in the application.

4.1.3.1 County Participation Options

Word 97 is a required application for CWS/CMS users in all counties. Word 97 is installed as part of the base CWS/CMS dedicated county image.

4.1.4 Electronic Mail Client

The CWS/CMS Project standard for an electronic mail (e-mail) client is Microsoft's Outlook 98.[5] Outlook 98 is a multi-purpose messaging client program, designed for use with Microsoft Exchange. (See *Section 4.3.5*) Installed on CWS/CMS client computers, this product provides users with electronic mail capabilities for sending and receiving messages, and also provides calendaring and scheduling capabilities.

4.1.4.1 County Participation Options

All dedicated counties are required to use Microsoft Outlook 98 to access the Project-sponsored Microsoft Exchange servers. Microsoft Outlook 98 was chosen for the dedicated counties because of the easy and functional connection made to the Microsoft Exchange Servers supported by IBM. It was also chosen because it offered a migration path from the previous Project e-mail system; Microsoft Mail. Outlook 98 is installed as part of the base CWS/CMS dedicated county image.

Each coexistent county has the option of selecting the software they will use to supply e-mail functionality. Coexistent counties participating in the Project-sponsored e-mail offering are required to use Outlook 98. Coexistent Counties not using the Project-sponsored e-mail solution may use any e-mail client compatible with the county's e-mail strategy.

4.1.4.2 Domain Enterprise Administration (DEA)

Domain Enterprise Administrator (DEA) is a Microsoft Exchange Public Folder based application that allows management unit administrators to manage user accounts in the Master Accounts Domain. DEA creates a hierarchical structure of folders that relinquish control over security within a management unit to management unit administrators. Rights to administer

[5] The e-mail client is documented in detail in the *CWS/CMS Exchange Architecture* document, which is an IBM Global Services generated document available through the State from the Project Office library.

management units are setup through standard Exchange security. Each management unit folder has three subfolders: *Groups, Users,* and *Distribution Lists*. The first is used to work with user accounts, the second with global groups in the Master Accounts Domain and the third with the Microsoft Exchange distribution lists.

Information in all subfolders is synchronized with the NT Security database in the Master Accounts Domain and Microsoft Exchange Directory. DEA Folders contain Microsoft Outlook forms. Each of these forms corresponds to a DEA user account (the Users folder), a global group (the Groups folder), or a distribution lists (the Distribution Lists folder). The DEA user account represents a combination of a NT user account and a corresponding Microsoft Exchange mailbox.

4.1.4.2.1 DEA Client setup

DEA is a native MS Exchange electronic forms application. That means that the form's code is stored in the Exchange server and distributed to a client machine on an as-needed basis. Code associated with each form is downloaded to a client machine each time a user tries to open a form, and a form is not present if the form cache is on a client's machine. DEA uses Microsoft Transaction Server-based components to retrieve and update information about all objects. Communication with these components is performed through DCOM. This technology requires a special stub module that is used for the Domain Enterprise Administrator to be installed on each machine. The stub module setup is located in the All Public Folders/DEA/Support/Client folder and is called DEAServices.exe.

4.1.4.2.2 County Participation Options

All counties using the Project-sponsored Microsoft Exchange server infrastructure are required to use DEA for e-mail user administration. DEA is not included in the CWS/CMS dedicated county images and is delivered to the workstation from the Exchange server as a custom installation placed on the county e-mail administrator's workstations only[6].

4.1.5 3270 Terminal Emulation

The CWS/CMS external interface service uses IBM's Personal Communications software to establish a client session with targeted host systems. Personal Communications is a 3270 terminal emulation application implemented to provide CWS/CMS users with access to host applications including MEDS, LIS, CDS and SAS. The CWS/CMS Application uses Personal Communications to provide a direct shortcut through the application for access to MEDS/LIS. This shortcut is supported under the current version and configuration of Personal Communications as delivered to dedicated counties.

These interfaces all require 3270 access to a remote host. To provide this functionality and accommodate any other need for similar access, the IBM Personal Communications software is included in the CWS/CMS workstation image. The CWS/CMS Application includes icons used to automatically open some host sessions, but all supported host sessions can be opened independently of the CWS/CMS Application. All of them use the same emulation software, and

[6] The DEA is documented in detail in the "Domain Enterprise Administrator - User Documentation" document and is available through the State from the Project Office library.

the configuration of this software (as well as the CWS/CMS Application) is up to the person using the machine.

Not all counties use all of these tools and services. Some counties may use additional 3270 services beyond those listed above. The Personal Communication software allows for the use of a custom programmable EHLLAPI interface to help the user to make quick connections to any remote host site they may need and to which they have access. The API call support was part of the requirement for the emulation software, and it is how the CWS/CMS Application works with the software.

4.1.5.1 MEDS and LIS Host Application

Access to the MEDS and LIS applications is integrated in the CWS/CMS Application. Executing a PCOM icon within the application establishes a 3270 session with the CWS/CMS gateway server. For dedicated and participating coexistent counties, the Project provides limited access to the MEDS and LIS applications. A trusted user access agreement with MEDS and LIS provides all RACF-authenticated CWS/CMS users with limited access to the host applications.

4.1.5.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored 3270 emulation service offering to connect to the MEDS/LIS 3270 gateway servers. Personal Communications is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Project-sponsored 3270 emulation service offering. Coexistent counties not using the Project-sponsored offering will be required to assume the responsibility for providing a 3270 emulation strategy commensurate with county standards for their CWS/CMS workstations.

4.1.5.2 CDS Host Application

Access to the county CDS application is integrated in the CWS/CMS Application. Executing a PCOM icon within the application establishes a 3270 session with the CDS gateway server.

4.1.5.2.1 County Participation Options

Only Placer, San Francisco, Tulare, and Yolo counties participate in the Project-sponsored CDS offering. Personal Communications is installed as part of the base CWS/CMS dedicated county image and customized to point to the county's CDS gateway server.

4.1.5.3 Statistical Reporting

Access to the CWS/CMS statistical reporting application, SAS, is independent of the CWS/CMS Application. Executing a PCOM icon on the workstation desktop establishes a 3270 session with TSO. The SAS application is then initiated by the user for statistical queries against the CWS/CMS database.

4.1.5.3.1 County Participation Options

Dedicated counties using the statistical reporting capabilities within SAS are required to use the Project-sponsored 3270 emulation service to connect to the SAS 3270 gateway servers. Personal Communications is installed as part of the base CWS/CMS dedicated county image. Personal Communications is individually configured for workstations requiring statistical capabilities in accordance with the SAS installation process[7].

Coexistent counties may elect to participate in the Project-sponsored 3270 emulation service offering for access to statistical reporting. Coexistent counties not using the Project-sponsored offering will be required to assume the responsibility for providing a 3270 emulation strategy commensurate with county standards for their CWS/CMS workstations.

4.1.6 Office Productivity Suite

The Microsoft Office 97 software suite was delivered via Work Authorization WA9804 as an enhancement to the Base Contract Microsoft Word offering. Microsoft Office 97 - Standard Edition includes Microsoft Word used for word processing applications, Microsoft Excel used for spreadsheet applications, and Microsoft PowerPoint used for business presentation graphics and slide shows.

Microsoft Office 97 Standard is an application suite of business software consisting of the following applications:

Application	Description
Word 97	This word processing program is designed to provide text creation and editing functionality to be used in connection with the CWS/CMS Application.
Excel 97	This spreadsheet program is provided to CWS/CMS users as an additional program that may be of benefit to users in connection with other job functions outside of the scope of CWS/CMS Application use. This spreadsheet program is also used by the CWS/CMS Application.
PowerPoint 97	This presentation software is provided to CWS/CMS users as an additional program that may be of benefit to users in connection with other job functions outside of the scope of CWS/CMS Application use. This presentation software is not directly used by the CWS/CMS Applications.

Table 4-3 – List of Installed Office 97 Standard Applications

[7] The SAS/Statistical Reporting installation process is documented in the *CWS/CMS Statistical Reporting Architecture* document, which is an IBM Global Services generated document available through the State from the Project Office library.

4.1.6.1 County Participation Options

Dedicated counties are required to use the Project-sponsored Microsoft Office 97 software suite offering. Microsoft's Office 97 – Standard Edition is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Project-sponsored Microsoft Office 97 software suite offering. Coexistent counties not using the Project-sponsored offering will be required to assume the responsibility of providing a productivity suite strategy commensurate with county standards for their CWS/CMS workstations. Coexistent counties are required to provide Word 97 and Excel 97 for CWS/CMS Application-related documents.

4.1.7 Network Browser

The CWS/CMS Project provides a CWS/CMS web page (http://www.hwcws.cahwnet.gov/) for use by the CWS/CMS user base. Much of the documentation for the counties and State is kept on this central web server, which ensures consistent, timely, and accurate dissemination of documentation to all users in the CWS/CMS Project. Microsoft's Internet Explorer is the browser software selected to access web-based information. The CWS/CMS Project specifies that viewing the CWS/CMS web page requires Microsoft Internet Explorer.

4.1.7.1 County Participation Options

Dedicated counties are required to use the Project-sponsored Network Browser service. Microsoft Internet Explorer is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Project-sponsored service offering. Coexistent counties not using the offering will be required to provide a Network Browser strategy commensurate with county standards for all their CWS/CMS workstations. Coexistent counties not using Microsoft Internet Explorer may not be able to properly browse the CWS/CMS web page.

4.1.8 AT&T Network Services

The CWS/CMS Project provides a dial-up service to the CWS/CMS Application. Mobile CWS/CMS users must be able to use the CWS/CMS Application from remote locations. This service is provided for laptops by installing the AT&T Global Dialer software and a modem. With these installed, the user can make a connection to the CWS/CMS network from any analog telephone line. Laptop users are the primary users of these features. Some desktops are also configured with a modem and AT&T Global Dialer, and are referred to as Alternate Server Access (ASA) workstations. They are used as a backup method for connectivity to the CWS/CMS Application in cases of local server or network failure.

4.1.8.1 County Participation Options

All dedicated counties are required to use the AT&T Global Dialer for dial-up ASA communications, and it is installed on desktop workstations designated as ASA workstations. The AT&T Dialer is not included in the CWS/CMS dedicated county desktop image and is installed independently using the ASA installation process.

All dedicated counties are required to use the AT&T Global Dialer for remote dial-in communications from the laptop. The AT&T Global Dialer is installed on all laptops as part of the base CWS/CMS dedicated county image for laptops.

Any coexistent counties electing to participate in the Project-sponsored ASA or remote dial-up architecture are required to install the AT&T Global Dialer. Counties not participating in the Project-sponsored solution may elect to use their own dial-in strategy to deliver remote access functionality for county users.

4.1.9 Application Help Services

The CWS/CMS Online Release Notes application (ORN) provides users with information concerning high-impact changes to the CWS/CMS Application. Project staff, consisting of county, State, and vendor personnel, select topics based on the following criteria:

- The change alters the way a user performs a work task in CWS/CMS
- The change is an enhancement (i.e., not a fix) to CWS/CMS

Each change is listed alphabetically by category and includes the System Change request (SCR) number. The Release Notes-High Impact Items package will be published before every CWS/CMS Application release and distributed to the county designated server. The package will contain the following items:

- A brief, descriptive list of all CWS/CMS changes (spreadsheet – soft copy).
- A list of CWS/CMS high-impact items (MS Word file – soft copy).
- CWS/CMS Online Release Notes (the on-screen presentation of high impact items) with printable lists of impact items grouped by area of interest. In the online version, this includes “Show Me” screen prints of where the changes take place exist (when applicable).

4.1.9.1 County Participation Options

ORN is an optional application available to all counties. ORN is not included in the CWS/CMS dedicated county images and is installed independently using the ORN installation process.

4.1.10 Computer-Based Training

In the current CWS/CMS Application training process, CWS/CMS users have access to an IBM-developed CWS/CMS Computer-Based Training package (CBT), whose primary audience is new users of the CWS/CMS Application. For a student to use the CBT, a county help desk representative must download the CBT program from a server and install it on the student’s workstation.

4.1.10.1 County Participation Options

CBT is an optional application available to all counties. CBT is not included in the CWS/CMS dedicated county images and is installed independently using the CBT installation process.[8]

4.1.11 CWS/CMS Scenario Manager

The Scenario Manager Application is a Project developed training program designed for classroom instruction. Scenario Manager is a shell that executes using the CWS/CMS Application to guide users through training simulations based on realistic case studies. User interaction is similar to situations that occur in the production environment. For a student to use the Scenario Manager, a county help desk representative installs the Scenario Manager application from a CD-ROM onto the student's workstation.

4.1.11.1 County Participation Options

Scenario Manager is an optional application available to all counties. Scenario Manager is not included in the CWS/CMS dedicated county images and is installed independently using the Scenario Manager installation process.

4.1.12 Web-Based Services

Several web-based services are sponsored under the CWS/CMS client presentation suite umbrella. These services include Adobe Acrobat Reader, a PDF document reader, and Web-Based Training. While these services would normally be considered "External Infrastructure" in nature, they are presented here due to their client presentation structure and because of their requirement to operate using installed browser-based plug-ins.

4.1.12.1 PDF Document Reader

Much of the documentation available on the Internet is produced in the Portable Document Format (PDF), which requires the Adobe Acrobat Reader to view. This browser plug-in is included on the dedicated county workstation image.

4.1.12.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored PDF document reader service (Adobe Acrobat Reader). Adobe Acrobat Reader is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Adobe Acrobat Reader offering. Coexistent counties not using the Project-sponsored offering will be required to assume the responsibility for providing a PDF document reader service strategy that is commensurate with county standards.

4.1.12.2 Web-Based Training

In an effort to provide students with a training environment that accommodates unique and varied audience characteristics, a Web-Based Training (WBT) course was developed to offer

[8] The CBT installation process is documented on the release CD-ROM.

CWS/CMS users with “just-in-time, just enough” training for the CWS/CMS Application. The training is designed to be self-paced, specific, granular, and task-oriented, and will provide students with a flexible delivery schedule on an as-needed basis. Students can work at a comfortable pace suited to their personal skills. It is delivered via the Project-supported web browser, Microsoft Internet Explorer, and accessible through the Internet or the HHSDC intranet, so students can access WBT from any Internet-connected computer, whether at home or in the field.

WBT lessons are created using Macromedia Authorware 5.2, a flow-based program. Each lesson has its own file packaged specifically for web access. A lesson is launched when a student clicks on the link to a specific lesson, which initiates an Authorware web file. This file opens a new browser window for the lesson. The new browser window is 800x600 pixels and does not contain the standard navigation bars in order to maximize screen space for curriculum material.

Macromedia Authorware Web Player

A Macromedia Authorware web plug-in is used to stream the WBT pages to the student’s workstation. No WBT files are stored on a student’s workstation. This design is beneficial for the student, because valuable storage space on a student’s hard drive is not required to run the WBT.

To use the WBT in a browser, the plug-in must be installed. While CWS/CMS has traditionally been "pushed" to the workstation, browser updates (specifically plug-ins) are typically performed on an “as-needed” or "pull" fashion. With the Authorware Web Player plug-in, the website is constructed so when a student first accesses the WBT material, the plug-in is automatically installed without student interaction (with the exception of a single confirmation dialog).

While there are two versions of the player available (one for Microsoft Internet Explorer and one for Netscape Navigator), this project supports only the CWS/CMS workstation image of Microsoft Internet Explorer. It should be noted that the Netscape Navigator version of the plug-in requires student interaction and is not supported by the Project.

4.1.12.2.1 County Participation Options

WBT is an optional service available to all counties via the CWS/CMS Web Server (www.hwcws.cahwnet.gov). Counties electing to use the WBT service require the installation of the Authorware Web Player, an Internet Explorer plug-in. The Authorware Web Player is not included in the CWS/CMS dedicated county images and is installed independently using the Authorware Web Player installation process[9].

4.1.12.3 xTools

xTools is a suite of tools employed in conjunction with the CWS/CMS database. These tools allow the user to view the mappings associated with individual entities and attributes, determine where they are located in the CWS/CMS database structure, and view how they are inter-

[9] The Authorware Web Player installation process is an Internet Explorer plug-in initiated by the WBT application when executing the first WBT module.

related. Users can develop SQL or SAS queries, translate between Base 62 and Base 10 keys used in the database and application, and even determine the creator of a particular key.

The following lists each xTool application and a brief description of its purpose:

- Xdatabase - For any entity or attribute, shows information, relationships, indexes, code values, or the CWS/CMS screens on which they appear.
- xKeyTranslator - Translates both ways between the Base 62 Key used in the database and Base 10 Key found in the CWS/CMS Application. Either key provides the date and time of creation and the creator's ID. Users can also generate a new key.
- Xscreens - Finds an entity/attribute name (in logical, physical, or SAS format) by cross-referencing with CWS/CMS screen information.
- XSQLBuilder - Builds SAS or SQL database queries.

4.1.12.3.1 County Participation Options

xTools is an optional service available to all counties via the CWS/CMS Web Server (www.hwcws.cahwnet.gov). xTools is not included in the CWS/CMS dedicated county images and is installed by downloading the self-contained installation application (uses InstallShield) from the CWS/CMS Web Server.

4.1.13 County Access to Data

The CWS/CMS Application provides structured access to CWS/CMS data, which includes some built-in reports. However, some users have a need for more flexible data access. The County Access to Data service (CAD) provides flexible data access and ad hoc queries to CWS/CMS data. There are several software packages installed on the workstation that assist in providing this service. Because a relatively small number of users statewide require CAD, the software packages required for it are not installed in the standard CWS/CMS workstation image and are added at a later time.

The following software packages are installed to provide the CAD service:

Software Package	**Purpose**
Business Objects	Query Tool and User Front End Application
DB2 CAE	Provides Database Connectivity
IRE's Safenet SoftRemoteLT	IPSec VPN Client for Ethernet Workstations

The CAD service has additional system requirements beyond the standard CWS/CMS workstation image. A workstation using CAD requires at least a CWS/CMS Windows 95 image running on a 450-MHz Pentium-based processor with 128 MB of RAM.

4.1.13.1 Business Objects (Full Client)

Business Objects is a query tool that provides a programming interface between the end-user and the DB2 database. This layer is designed to be user friendly and contain elements that are familiar to the user presented in a language that they can understand. Without having to know how to create reports using the Structured Query Language (SQL), end users can use the simple GUI interface provided by Business Objects to retrieve, analyze, and manipulate the data, which they can put into valuable information reports.

4.1.13.2 Database Connectivity (IBM DB2 Client Application Enabler – CAE)

The CAD project uses IBM's DB2 Client Application Enabler (CAE) as the database application requester layer. CAE allows communication between the databases on the CAD server and the Business Objects querying tool residing on the client workstations.

4.1.13.3 Virtual Private Network Clients (SafeNet SoftRemoteLT)

The CAD application generates ad hoc queries retrieved by Business Objects from the CAD database. Since the nature of the data is highly sensitive, it is necessary to incorporate a security measure to encrypt the data stream between the CAD server and the client workstations. In order to do this, the CAD Project employs a virtual private network (VPN) using the latest IPSec standards.

In addition to being a database server, the CAD server performs the function of an IPSec tunnel endpoint. VPN client software is installed on each of the workstations accessing the CAD environment

4.1.13.4 County Participation Options

The CWS/CMS CAD Business Objects solution is an option available to all counties. CAD is not included in the CWS/CMS dedicated county images and is installed independently using the CAD installation process.[10]

4.2 Workstation Infrastructure Services

The CWS/CMS Infrastructure Services consist of the applications executing on the workstation as support and communication services for the workstation. Executing on the local workstation, these applications use the NOS environment to interface with the CWS/CMS Application servers. Infrastructure Services are implemented at Tier 4 of the CWS/CMS Logical Framework Model (*Figure 2-2*).

Dedicated counties may only implement Project-sponsored workstation services.

Coexistent counties may elect to modify the services available to the user. Coexistent counties are responsible for determining any additional service requirements beyond the CWS/CMS client presentation suite. If required, coexistent counties will be responsible for providing any additional services using county-owned and managed infrastructure.

[10] The "CAD Installation Process" is documented in PCAT v3_1 Install for Win2k VPN Upgrade.doc.

4.2.1 Antivirus Services

Antivirus software is required to protect workstations from malicious or accidental attacks that could compromise or damage the data collected by CWS/CMS. The software includes frequent virus definition updates that combat new viruses detected in the world; these updates are posted and supported by Symantec. The IBM Server Management team can remotely configure the software to enforce processes such as mandatory scans on all systems, or to lock down scanning functions so users can not cancel them and compromise their systems. The Server Management team pushes virus definition and software updates to clients participating in the Project-sponsored Antivirus service offering.

4.2.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored Norton Antivirus service offering. Norton Antivirus is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Norton Antivirus service offering. Coexistent counties not using the Project-sponsored Antivirus service offering will be required to assume the responsibility for providing its own antivirus strategy to meet county requirements for county users.

4.2.2 Software Distribution

The CWS/CMS Project uses several tools to manage the distribution of software updates to the field. These tools include:

- User Logon Script Files
- CWS File Transfer (CWSFT)
- Network Auto-installer Program 2000 (NAP2K)

4.2.2.1 Logon Scripting

The Windows 2000 domain logon scripts are the primary method used for software distribution. This method is adequate for most small distributions that are typical of the CWS/CMS implementation. Larger software distribution packages are managed through the NAP2K process as described in *Section 4.2.2.3*.

Software distribution sub-scripts are customized within the logon script and executed as part of the logon process. Scripting provides the IBM Server Management team workstation management capabilities that range from a single user to the entire CWS/CMS enterprise.

4.2.2.1.1 County Participation Options

Dedicated counties are required to implement the Project-sponsored logon scripting service.

Coexistent counties are required to execute the CWS/CMS logon script and can elect to use the logon scripting service directly by having CWS/CMS users authenticate to the CWS/CMS Domain or indirectly by executing the logon scripts after users authenticate to a county domain.

4.2.2.2 CWS File Transfer (CWSFT)

CWSFT is a custom-developed application initiated by the workstation logon script. CWSFT transfers files from the CWS/CMS software distribution server to the workstation. It includes logic to transfer only those files that are updates to the workstation's existing configuration.

4.2.2.2.1 County Participation Options

All counties are required to implement the Project-sponsored CWSFT software distribution service. This service is initiated through the logon scripting service.

4.2.2.3 Network Auto-installer Program 2000 (NAP2K)

The NAP2K was developed by IBM to provide a management shell for the automatic installation of software packages. The NAP2K is a software application installation program designed to meet two major criteria. The first criterion is to provide CWS/CMS users increased flexibility with the installation of software applications. The second is to resolve impacts to bandwidth and server usage during the installation of large software applications.

NAP2K provides the user a window of opportunity to execute application software installations. This window can range from a couple of days to several months. If NAP2K determines an application program needs to be installed, it launches the setup process for the application and provides the user the option to postpone the installation, install sometime during the day, or install after normal business hours.

The second criterion addressed is network/server usage. NAP2K meters the quantity of application installations and allows only a predetermined number of installations to be executed concurrently. Details of the NAP2K program are documented in the *Network Auto-Installer Program – Technical Guide* document.[11]

4.2.2.3.1 County Participation Options

Dedicated counties are required to implement the Project-sponsored software distribution architecture.

Coexistent counties are responsible to provide software distribution services to county CWS/CMS users using county-owned and managed infrastructure. The NAP2K service is available to coexistent counties to assist with the installation of CWS/CMS-related software and may be used through Project-sponsored service offerings or independently contracted by the county.

4.2.3 Workstation Management

The CWS/CMS Help Desk has several methods available to assist with the remote management of CWS/CMS workstations. Two regularly used tools include:

- Logon Script

[11] The *Network Auto-Installer Program - Technical Guide* is a separate deliverable identified as WA9804 – A8

- IBM Director

The CWS/CMS Project Help Desk provides workstation management for dedicated counties. The Project does not support workstation management for coexistent county workstations.

4.2.3.1 Log-on Scripting

The IBM Server Management team uses logon scripting to manage CWS/CMS client presentation suite and characteristics of the CWS/CMS workstation configurations. Executable programs within logon scripts are also used to gather workstation statistics or modify workstation configurations for maintenance and upgrades.

4.2.3.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored logon scripting service. Logon scripts are executed by the workstation at the time user logs on to the network.

Coexistent counties are required to execute the CWS/CMS logon script and can elect to use the logon scripting service directly by having CWS/CMS users authenticate to the CWS/CMS Domain or indirectly by executing the logon scripts after users authenticate to a county domain. Coexistent counties not using the logon scripting service will be required to assume the responsibility for all features supported by the logon scripting service for all their CWS/CMS workstations.

4.2.3.2 IBM Director

Remote workstation shadowing provides the capability for the CWS/CMS Help Desk to monitor users' computer interactions (with permission from the user) from a remote location. IBM Director provides this system management function in a Windows 2000 Server environment. IBM Director also provides the CWS/CMS Help Desk the ability to remotely take over the I/O functions of the workstation.

4.2.3.2.1 County Participation Options

All dedicated counties are required to use the Project-sponsored IBM Director service. IBM Director is installed as part of the base CWS/CMS dedicated county image.

Coexistent counties may elect to participate in the Project-sponsored workstation shadowing strategy. Coexistent counties not using the IBM Director service assume the responsibility for providing any workstation shadowing products to provide remote management capabilities as supported within the county's workstation management strategy.

4.2.4 Workstation Image

4.2.4.1 Workstation Image Creation

The Project creates an image for workstations that are purchased through the Project. This image is often referred to as the "dedicated county" image and is designed to operate in a dedicated county environment.

4.2.4.2 Workstation Image Updates

Workstation images are updated by the Project approximately twice a year (as needed), due to changes to the software installed on existing CWS/CMS workstations. These changes can be new applications or upgrades to previously-installed applications.

4.2.4.3 County Participation Options

Dedicated counties are required to use Project-created workstation images.

Coexistent counties can elect to use the dedicated county workstation image, a modified version of the dedicated county image, or a workstation image developed by the county. The coexistent county is responsible for any customizations to the new or dedicated county image.

4.2.5 Workstation Recovery

The Project supports an image recovery method for workstations that are purchased through the Project. The recovery process is validated for all workstation configurations supported by the Project. Windows 2000 workstation images are provided on CD-ROM. Details of the workstation recovery process are identified in the *Windows 2000 Workstation Recovery Guide* document[12].

4.2.5.1 Recovery Process

The Windows 2000 recovery process rebuilds a Windows 2000 workstation when a problem with the workstation cannot be corrected. The process will install a dedicated county Windows 2000 image that provides TCP/IP support for the CWS/CMS Application. The workstation recovery process is a local CD-ROM-based process. The Windows 2000 image is too large for the current infrastructure to support either the storage or bandwidth required for a server-based recovery.

A recovery CD-ROM is provided for each machine type supported by the project. At this time, the only supported recovery method is via Bootable CD-ROM.[13] Details of the recovery process are documented in the *Windows 2000 Workstation Recovery Guide*.

4.2.5.2 Power Quest Drive Image Pro

This is the tool used for the creation of and replication of the images deployed to each workstation. The current Windows 2000 workstation recovery strategy uses Drive Image to capture all the data on the machine and package it into a single file. When a machine needs to be recovered, Drive Image is used again to read the file it created and to deploy the data down to the workstation.

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[12] The *Windows 2000 Workstation Recovery Guide* is a separate deliverable identified as WA0006-C3.

[13] Each CD-ROM will also have a “Diskette” directory on it that can be used to create a boot-disk for the machine type. This is included as a courtesy to those that may have the required CD-ROM in their system, but for whatever reason, the system will not support booting from a CD-ROM. It is not expected that this process will ever be used, but it is provided as a means to support this situation.

4.2.5.3 County Participation Options

All dedicated counties will use the Project-developed workstation image and recovery process.

Coexistent counties can participate in the Project-sponsored workstation image and recovery process or elect to use a workstation imaging/recovery process commensurate with county standards. The coexistent county is responsible for any customizations to the dedicated county image or process required by the county.

4.2.6 Network Services Interface

The foundation of the workstations' network communications interface is based on the TCP/IP protocol. The CWS/CMS Application requires that the workstations communicate with middleware servers, and that the servers communicate with print services[14]. The Network Infrastructure group decided to use TCP/IP exclusively on the workstations once Windows 2000 is deployed. Previously, NetBEUI was used along with TCP/IP.

4.2.6.1 TCP/IP

TCP/IP is a natively supported protocol in both Windows 95 and Windows 2000. It is fast, widely accepted as an industry standard protocol, and is the only protocol supported for World Wide Web access. Web access is currently a project requirement for documentation, as explained elsewhere in this document. TCP/IP is routable, making it a perfectly functional protocol even for highly mobile users who may have to connect to the network in various and/or widespread locations. It also enables the CWS/CMS Help Desk to meet the requirement of Remote-Shadowing computers for support purposes.

4.2.6.1.1 County Participation Options

All county workstations are required to use TCP/IP as the Client/Server communications protocol.

4.2.6.2 NetBEUI

NetBEUI is mentioned here because of its historical use with the CWS/CMS Application. The CWS/CMS client/server infrastructure for Windows 2000 Workstations does not support NetBEUI under Windows 2000 Server Operating System. NetBEUI is the protocol originally used for the project, and both Windows 95 and Windows 2000 support it natively. It is fast and efficient in a small environment, but it is severely limited in large networks. Because it is not a routable protocol, it is only good for connecting a small group of computers to a server. To support the larger network required for the CWS/CMS Project, a routable protocol is needed.

4.2.6.2.1 County Participation Options

NetBEUI is not supported within the Windows 2000 Workstation Architecture.

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[14] Network communication is needed for a number of other things not listed in this section. For instance, Microsoft Outlook (discussed later in this document) requires the network to communicate with a central server, browsers use the network to access county documentation, centralized databases require the network to be shared among large number of users, and other shared resources also use the network.

4.2.6.3 Host Access

CICS Universal Client provides the interface for the CWS/CMS Application to communicate with the CICS Server Gateway[15]. CICS Universal Clients can be used for the transaction management of applications, which allows the CWS/CMS Application to exploit modern graphical or multimedia interfaces for increased usability and productivity. Data can be exchanged directly between CICS and the CWS/CMS Application at the workstation.

The External Interface Call (EIC) enables the CWS/CMS Application to call a CICS program synchronously or asynchronously as a subroutine[16]. The application communicates with the server CICS program and by using a common data area passes data to and from the CICS server application. The common area is passed to the CICS server on the call, and the CICS program typically populates it with data accessed from files or databases on the host, which is then returned to the client for manipulation or display.

4.2.6.3.1 County Participation Options

CICS Universal Client is a required application for CWS/CMS users in all counties.

4.2.7 Name Resolution

Domain Name Service (DNS), Windows Internet Naming Service (WINS), LMHOSTS files, and HOSTS files are all used for the same purpose. Each provides, in different ways, a means of converting a device's domain name or "friendly name" on the network to a TCP/IP address. The CWS/CMS Application looks for the "friendly name" on the network for its functionality. The networking protocol then needs to convert these "friendly names" to actual TCP/IP addresses to communicate correctly. DNS and WINS are External Infrastructure services and are addressed in *Section 4.3* below.

4.2.7.1.1 County Participation Options

Dedicated counties are required to implement the Project-sponsored DNS and WINS service offerings. LMHOSTS and HOSTS files are not supported on Windows 2000 in dedicated counties.

Coexistent counties may elect to participate in the Project-sponsored DNS and WINS service offerings. Coexistent counties not using the offering must provide a DNS services strategy commensurate with county standards for all their CWS/CMS workstations.

4.2.8 Backup Strategy

Currently, storing personal or business data on a workstation or laptop is not supported and strongly discouraged. Accordingly, no backup of workstations or laptops is supported. Users or counties may implement their own backup procedures as their resources allow.

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[15] Detailed information on the TX-Se*ries CICS Universal Client is available in the* CICS Universal Client for Windows – Administration Guide published by IBM.

[16] Detailed information on the CWS/CMS Applications use of CICS Universal Client is available in the *CWS/CMS Application Architecture* document.

4.3 External Infrastructure Services

A forest represents the association of workstations, servers, file services, print services, user ID authentication, LAN resource security functions, and associated infrastructure required to deliver application and system management services to the user. Forest structure plays an important part in overall network reliability, and proper planning is essential to maintain a structured network. Overall network services such as domain security, trusts, WINS, DHCP, and DNS can be administered and managed once an overall structure has been established. The *CWS/CMS Windows 200 Infrastructure Architecture* document[17] presents a detailed perspective of the Windows 2000 forest architecture.

The CWS/CMS workstation communicates with the forest via the external infrastructure services. These external services are provided at Tier 1 through Tier 4 of the CWS/CMS Services Logical Framework Model. (See *Figure 2-2*)

4.3.1 Network Operating System

The CWS/CMS client presentation suite was originally deployed using the OS/2 WARP Network Operating System (NOS) and Windows 95 workstations. Until the deployment of Windows 2000, this was the only NOS supported by the CWS/CMS client presentation suite.

4.3.1.1 Windows 2000 Server

Microsoft Windows 2000 Server is a multi-processing and multi-user Network Operating System (NOS) environment that enables the management of local and network resources through a Graphical User Interface (GUI). Microsoft Windows 2000 Server is a prerequisite prior to the installation of Windows 2000 Professional workstations.

The Windows 2000 forest service is implemented at Tier 1 (*Figure 2-2*) of the CWS/CMS Logical Framework Model. Windows 2000 Servers (domain controllers and/or application servers) located on the Domain network segment (Tiers 3 and 4), logically provide computing services that are either distributed across several computers or in tandem within a larger multi-function server.

4.3.2 Workstation Security

Windows 2000 Professional provides several security features that are implemented into the CWS/CMS Workstation Architecture.

4.3.2.1 User Authentication

Windows 2000 Professional, in conjunction with Windows 2000 Server, provides a user authentication service validating a user's logon ID against the Active Directory Service user ID access accounts. Users are provided with an active directory account in the CWS/CMS Windows 2000 Forest. This account is used for access to both network resources and the local workstation. Users will be unable to gain access to a workstation, even for non-network applications, without proper authentication. After a user performs a successful logon to a specific workstation, their logon credentials are cached locally so in the event the domain

[17] The "CWS/CMS System Architecture" document is a separate deliverable identified as W2303-C02.

controller is unavailable, users may still log on to the workstation. The use of active directory accounts for workstation logon authentication instead of locally-defined accounts allows for centralized management of IDs and the ability for users to log in to any CWS/CMS workstation within the county.

A separate authentication process is in place for access to the CWS/CMS Application. For a more detailed discussion of this process, please refer to the *CWS/CMS Application Architecture* document.

4.3.2.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored active directory user authentication service offering.

Coexistent counties may elect to participate in the active directory user authentication service offering. Counties using this service must log on to the CWS/CMS Windows 2000 forest. Coexistent counties not using the authentication service offering will be required to assume the responsibility of validating user access to the workstation and to CWS/CMS network services.

4.3.2.2 Local Data Security

Windows 2000 Professional offers three different file systems for local hard drives; Fat, Fat32, and NTFS. The CWS/CMS Windows 2000 workstation architecture specifies the use of the NTFS file system. Unlike the FAT file system, NTFS allows access to files on the local hard drive to be granted to authorized users only. By default, each user who logs into a workstation will be provided individual “My Documents” folders. Other users will not be granted access to these user-specific folders. This allows data stored locally on CWS/CMS workstations to be protected from unauthorized access.

Additionally, NTFS also allows critical system files to be protected from accidental deletion by unauthorized users through the use of file management options.

4.3.2.2.1 County Participation Options

Dedicated counties are required to use the Project-sponsored NTFS file system and local data security model.

Coexistent counties may elect to participate in the local data security service offerings. Coexistent counties not using the local data security service offering will be required to assume the responsibility for setting policies and securing data on the local hard drive of workstations.

4.3.3 Workstation and User Policies

Workstation and/or user policies are a method of controlling the look, feel, and certain workstation functionality from the servers. Policies can then be applied to all relevant workstations/users at the same time, providing a consistent look and feel to the workstation, as well as preventing changes to that look and feel. Policies are mostly used to prevent the users from actions that cause their workstations to run incorrectly. They do not, in themselves, add functionality to the system, but are highly useful to the CWS/CMS Help Desk because they ensure a measure of consistency among the users' workstations. See *Appendix 3* for a more detailed list of policies that are included in the Project-sponsored policy service.

4.3.3.1 County Participation Options

Dedicated counties are required to use the Project-sponsored policy service offering.

Coexistent counties joined to the CWS/CMS forest will receive a subset of the policies distributed to dedicated counties. Coexistent counties not joined to the CWS/CMS forest will be required to assume the responsibility for managing workstation and user policies for all their CWS/CMS workstations.

4.3.4 Network Services

4.3.4.1 IP Address Allocation

Dynamic Host Control Protocol (DHCP) is how a computer receives its TCP/IP information and addressing schemes. Several things are given to the computer when it first makes a request of the DHCP server. It receives an IP Address on the LAN relative to where the workstation is located at the time, and it receives other information relative to their location, including the IP address of DNS and WINS servers used for communicating with remote machines. The main advantage of using DHCP (instead of assigning an IP address to each machine manually) is that the machine and/or user can be moved to any location and, without any re-configuration, be immediately ready to work on the network. This is the “Dynamic” aspect reflected in this feature’s name.

4.3.4.2 Name Resolution

Domain Name Service (DNS) and Windows Internet Naming Service (WINS) are used for the same purpose. Each provides, in different ways, a means of converting a device’s “friendly name” on the network to a TCP/IP address. The CWS/CMS Application looks for the “friendly name” on the network for its functionality. The networking protocol then needs to convert these “friendly names” to actual TCP/IP addresses to communicate correctly.

4.3.4.2.1 Domain Naming Service (DNS)

DNS allows clients to ascertain a host’s IP address when providing the DNS server with the computer’s host name (fully qualified domain name). Fully qualifying domain names are used on the Internet. An example of a fully qualifying domain name is “cws.cahwnet.gov,” which identifies CWS. DNS is implemented at Tier 1 and Tier 4 (*Figure 2-2*) of the CWS/CMS Logical Framework model.

DNS is a file that was originally manually maintained as a static file containing information similar to WINS. In recent years DNS has become dynamic in nature, being updated automatically from network devices. It provides essentially the same information as WINS and is stored in a central location on Windows 2000 servers. DNS will be the only name resolution service used by the Windows 2000 workstation platform.

4.3.4.2.1.1 County Participation Options

Dedicated counties are required to use the Project-sponsored DNS service offering.

Coexistent counties may elect to participate in the DNS service offering. Coexistent counties not using the DNS service offering will be required to assume the responsibility for managing domain name resolution services for all their CWS/CMS workstations. Coexistent counties that do not use the Project-sponsored DNS services (by pointing their clients directly at the CWS

DNS servers) must configure their county DNS servers to perform one of the following functions:

- Zone Transfer: Setup *cwsd0CC.cws.cahwnet.gov*, where CC is the CWS county number, as a secondary zone on the county DNS server.
- Zone Forwarding / Zone Delegation: Configure the county DNS server to forward all requests for the zone *cws.cahwnet.gov* to the local CWS DNS server.

4.3.5 File and Print Services

File and print capability are provided through the Windows 2000 Server operating system. Using these services entails establishing access rights to the server supporting the specified service.

4.3.5.1 File Services

The CWS/CMS Project supports a shared common disk storage strategy for dedicated counties. Mapping a drive letter to the specified drive share accesses this shared storage area. Users are provided read and/or write privileges depending on their access rights to the drive share.

4.3.5.1.1 County Participation Options

The Project-sponsored shared common disk storage strategy is available for dedicated counties only.

The Project does not support shared common disk storage for coexistent counties. Coexistent counties requiring shared disk storage are required to provide this service to CWS/CMS users with county-owned and managed infrastructure.

4.3.5.2 Print Services

For the CWS/CMS Project, network printers were chosen to support the printing needs for activities that take place in and out of the CWS/CMS Application. This choice saves money for the counties and enables users to share printers rather than purchasing one for each workstation. Additionally, a standard and widely supported printer driver, HP Laserjet IIID, was chosen for consistency in printing documents. To date this PCL level 3 driver is supported by every succeeding rendition of PCL since its inception, and supports all the necessary features of the documents produced by the project. Choosing this driver requires that all purchased printers support the PCL standard of printing, but otherwise places few restrictions on the printers purchased for the project[18]. Using the network services listed below, workstations submit print jobs to queues on a local print server that is responsible for sending the job to the printer.

To support applications that require a printer, the printers will be configured on the Windows 2000 Servers. The Windows 2000 Professional workstations will receive their printer

[18] Only certain printers are actually supported by the CWS/CMS Help Desk and technical staff. This is not a technical limitation but a support decision based on CWS/CMS application compatibility testing and printer support requirements.

configurations directly from the server, and when the printer queues are updated on the server, those configurations will be sent automatically to the Windows 2000 Professional workstations. The server printer queues will be configured per the requirements of the CWS/CMS Application and Business Objects, which are respectively, an HPIIID driver and an HP5SI printer driver.

4.3.5.2.1 County Participation Options

Dedicated counties are required to use the Project-sponsored print service offering.

Coexistent counties may elect to participate in the print service offering. Coexistent counties not using the print service offering will be required to assume the responsibility for managing print services for all their CWS/CMS workstations on county owned and managed infrastructure.

4.3.6 Exchange Messaging Services

Microsoft Exchange Server is a collaborative messaging service designed to provide CWS/CMS users with a variety of messaging and planning services when used in conjunction with the Outlook 98 workstation application.

4.3.6.1 County Participation Options

Dedicated counties are required to use the Project-sponsored Exchange messaging service.

Coexistent counties may elect to participate in the Exchange service offering. Coexistent counties not using the Exchange messaging service offering will be required to assume the responsibility for providing an electronic messaging service for all their CWS/CMS users.

5 Hardware

Hardware is selected based on how well it supports the software chosen to meet the requirements of this project. Testing is performed on a variety of hardware platforms that will "support" the Operating System and software packages, and then performance statistics are balanced with budgetary requirements to decide what is optimal for the project.

The main items that control the decision of what hardware to support follow:

- Windows 2000 Operating System requirements
- CWS/CMS and additional software performance requirements
- Networking Infrastructure requirements, including Remote Access requirements
- Storage Capacity requirements for all software packages
- Hardware sub-component requirements

5.1 Software Operating Requirements

Each software package operating on the workstation identifies minimum hardware requirements that must be met before it can be loaded on a computer. These software requirements must be assessed to determine an aggregate total requirement for the workstation. Table 5-1 identifies the minimum hardware requirements for each of the application packages supported within the CWS/CMS client presentation suite.

Application Package	Processor Speed	RAM Memory	Disk Storage	Video
Windows 2000	133 Mhz	64 MB	950 MB	VGA
CWS/CMS Application[19]	400 Mhz– Desktop 450 Mhz – Laptop	128 MB	78 MB	SVGA – 600x800x16 bit
Office 97 Standard – Word 97, Excel 97	75 Mhz	16 MB	62 MB	SVGA
Outlook 98	75 Mhz	32 MB	40 MB	VGA
Personal Communications	75 Mhz	24 MB	40 MB	VGA
IBM Director	133 Mhz	32 MB	36 MB	VGA
Norton Antivirus	75 Mhz	64 MB	50 MB	VGA
Internet Explorer	75 Mhz	16 MB	55 MB	VGA
Adobe Acrobat	75 Mhz	10 MB	6 MB	VGA
AT&T Global Dialer	200 Mhz	64 MB	10 MB	VGA
CWS/CMS On-Line Release Notes	200 Mhz	32 MB	12 MB **	SVGA
Computer Based Training	400 Mhz – Desktop 450 Mhz – Laptop	128 MB	75 MB **	SVGA
Scenario Manager	400 Mhz – Desktop 450 Mhz – Laptop	128 MB	31 MB **	SVGA
Web Based Training	200 Mhz	32 MB	34 MB **	VGA
Business Objects	450 Mhz	128 MB	150 MB **	SVGA

[19] Performance requirements are identified in the “Windows 2000 Minimum Workstation Requirements Recommendation” document, deliverable WA0007 – e A1.

Application Package	Processor Speed	RAM Memory	Disk Storage	Video
Network Auto Installer Program 2000	200 Mhz	128 MB	10 MB	VGA
Minimum Specifications	400 Mhz – Desktop 450 Mhz – Laptop	128 MB	1337 MB	SVGA

Table 5-1 – CWS/CMS Minimum Requirements Specifications

** These applications are optional software packages and are not included in the minimum specifications for disk storage requirements.

5.1.1 Performance Requirements of CWS/CMS Client Presentation Suite

Windows 2000 has minimum requirements that must be met for it to run the operating system correctly, and it has greater requirements for it to run efficiently. The CWS/CMS Application, as well as other software (e.g., Microsoft Office), has requirements above and beyond those requirements as well. For this document, both will be concatenated and listed here.

5.2 Networking Infrastructure Requirements

Many of the services discussed in this document require the workstation to have a local area network (LAN) connection. Both Ethernet and token ring topologies can be used by the workstation services.

Ethernet is the CWS/CMS Project supported topology and is implemented in all dedicated counties. There are two main Ethernet speeds in use for LANs today, 10 MB and 100 MB. The CWS/CMS workstations must be equipped with network cards that can auto-sense between the two speeds and choose the correct speed for the local environment.

Many 10/100-MB Ethernet adapters support a Wake-on-LAN feature that allows a remote server to power up the workstation for remote maintenance. This feature is not currently required by the CWS/CMS Project; however, in preparation for its eventual implementation, this feature is recommended for the desktop workstation.

Coexistent county's networking strategy standards dictate the network topology used by the county. While many of the coexistent counties are using Ethernet, some counties have implemented a Token Ring topology. Regardless of the topology standard implemented, coexistent counties are responsible to manage and maintain their network infrastructure.

5.3 Remote Access Requirements

The CWS/CMS architecture provides for dial-up connectivity using a modem interface (see section 5.5.7). A minimum modem speed of 28.8-KB is required for laptops and ASA workstations to connect to the AT&T Global Network.

5.4 Workstation Hardware Sub-component Options

The workstation is composed of many sub-components that impact the capabilities of the workstation to deliver services to the users. A summary of the workstation hardware configurations is identified in Section 3.3. This subsection identifies these components and their requirement/association to the CWS/CMS client presentation suite.

5.4.1 Processor

Microsoft identifies a minimum processor speed of 133 MHz to run Windows 2000. However, Windows 2000 does not run sufficiently well on machines slower than a 200-MHz Pentium. Additionally, the CWS application adds a significant load to the processor, and therefore, the speed of a Pentium 400-MHz processor has been set as the minimum speed supported by the project for dedicated county desktop workstations. Laptops require a Pentium 450-MHz processor as the minimum speed needed to support the CWS Application.[20]

5.4.2 Memory

Windows 2000 will not install on a machine with less than 32 MB of RAM, and it runs poorly on anything less than 64 MB. Additionally, the CWS/CMS Application requires an additional 32+ MB of RAM. Testing shows that adequate performance can be achieved with a 128-MB configuration, which establishes the minimum specification requirements for both desktops and laptops.

Please note that testing also shows significant performance improvement by expanding the RAM of the system to 256 MB. Additional RAM beyond 256 MB improved performance very little.

5.4.3 Video Adapter

The CWS/CMS Application requires the highest level of resolution of the software packages installed on the workstation. (See Table 5-1) The CWS/CMS Application is written to provide minimum support for 800 x 600 x 16-bit colors requiring a video card supporting SVGA with 4 MB or more of video RAM.

5.4.4 Fixed Storage

The CWS/CMS workstation will use an industry-standard IDE mass storage disk drive.

5.4.4.1 Disk Partitioning

The CWS/CMS dedicated county workstation mass storage drive will use two partitions. The first partition (formatted using NTFS) will be visible to the user and used to store all files required for the CWS/CMS client presentation suite.

[20] The minimum workstation speed for the CWS/CMS client presentation suite is validated through the deliverable WA0007-A1, “Windows 2000 Minimum Workstation Requirements Recommendation”.

A second partition (formatted using FAT32) will be used by the workstation image recovery program as a storage area to transfer configuration data and the “My Documents” subdirectory on the first partition to the recovered workstation.

The second partition will be 2 GB in size with the remaining space on the drive devoted to the first partition.

5.4.4.2 Storage Capacity Requirements

A standard was set that requires three times the minimum required disk space, which allows for improved disk performance, future growth, and other functions that may require storage space. A minimum requirement of 6 GB was chosen, which is based on the total storage requirements of 1337 MB multiplied by three plus the hidden partition. The following is an approximate breakdown of these requirements:

- Windows 2000 requires nearly 950 MB for a basic installation, plus updates.
- The CWS/CMS Application requires approximately 78 MB.
- Additional required applications for the project (such as Microsoft Word) add a combined amount of approximately 309 MB to the basic build of a workstation.

5.4.4.3 Disk Speed

Disk speed is not an issue at the current time. The lowest industry standard for IDE is ample for the performance of the CWS/CMS Application and other packages that use it.

5.4.5 Removable Storage

The implementation of the core CWS/CMS client presentation suite is designed to be self-contained within the support structure of the CWS/CMS client/server network and does not required removable storage. However, several procedures and optional software packages require removable storage media.

5.4.5.1 CD-ROM (Compact Disk Read Only Memory)

The CD-ROM is required to deliver the workstation image to the workstation for recovery purposes and several optional applications (ORN, CBT, CAD) that require the installation of software from a CD-ROM reader.

5.4.5.2 Floppy Disk Drive

A 3-½ inch 1.44-MB floppy disk drive is required to initialize the workstation for recovery in the event that the CD-ROM reader is not available as a bootable device on the workstation.

5.4.6 Network Interface Card

The CWS/CMS Project supported workstation configuration utilizes an auto-sensing 10/100-MB Ethernet adapter. While almost any Ethernet card could be used in the workstation to support network connectivity, Project procured workstations and laptops are shipped with a specific Ethernet card that is the only card supported by the Project in the machine. This requirement simplifies the image management and recovery processes for the CWS/CMS environment.

Coexistent counties may use NICs other than CWS/CMS Project supported cards because of county hardware and/or networking standards. Support of these NICs is the responsibility of the county.

5.4.6.1 Wake-on LAN

Many 10/100-MB Ethernet adapters are supporting a Wake-on-LAN feature. This feature is not currently used by the CWS/CMS Project; however, in preparation for its eventual implementation, this feature will be required for all CWS/CMS Project supported desktop workstations.

5.4.7 Modem

The CWS/CMS Application uses ASA on the Desktop Workstation as an alternate network connection in the event of the failure of the LAN to connect to the host. ASA requires a minimum 28.8-KB modem to establish a dial-up connection to the CWS/CMS infrastructure.

Laptop workstations use standard Telco circuits for remote dial-up connections. A 28.8-KB modem provides the minimum connection speed acceptable with the CWS/CMS Application.

While almost any modem card could be used in the workstation to support dial-up connectivity, Project supported workstations are shipped with a specific modem card that is the only card supported by the Project in the machine.

Coexistent counties may use modems other than CWS/CMS Project supported cards because of county hardware and/or networking standards. Support of these modems is the responsibility of the county.

5.4.8 Sound

The CWS/CMS client presentation suite does not currently require a sound interface; however, previous work authorizations have used sound interfaces as pilot programs to test various methods of supporting user interaction with the workstation for input and output. It is expected that the use of a sound interface will continue to be tested and, while not required currently, it should be available on the workstation for potential future feature enhancements.

5.4.9 Multi I/O Interfaces

The current Intel-based Pentium processor compatible computers typically include the following peripheral interfaces:

- Universal Serial Bus (USB)
- Serial Interface - 16550 UART 9-pin connectors with RS232D Electrical Interface
- Parallel Interface - Bi-Directional ECP/EPP

These interfaces are not required for the current CWS/CMS client presentation suite; however, previous work authorizations have used these interfaces to support peripheral devices.

5.4.10 Keyboard

A standard 101-key enhanced keyboard is required for the CWS/CMS desktop workstation. Laptop workstations will be equipped with standard QWERTY keyboards that include the special keys required to navigate the display cursor (e.g., up arrow, down arrow).

5.4.11 Mouse

The CWS/CMS workstation is required to support a pointing device. A standard IBM or Microsoft mouse or equivalent is used for the CWS/CMS desktop workstation. The CWS/CMS laptop workstation will support a mouse, TrackPoint, touch pad or equivalent pointing device.

5.4.12 Monitor

The desktop workstation monitor must be at minimum a 15-inch monitor capable of supporting SVGA mode with 600 x 800 x 16-bit display characteristics with at least a .28-inch dot pitch matrix. The laptop workstation display must provide a 13.8-inch screen supporting SVGA mode with 600 x 800 x 16-bit display characteristics.

Appendix 1: Listing of Acronyms

ASA	Alternate Server Access
CAD	County Access to Data
CBT	Computer Based Training
CDPF	Central Data Processing Facility
CD-ROM	Compact Disk Read Only Memory
CDS	Case Data System
CDSS	California Department of Social Services
CSSF	Central Sacramento Server Facility
CICS	Customer Information Control System
COTS	Common Off the Shelf Software
CPU	Central Processing Unit
CWS/CMS	Child Welfare Services / Case Management System
DCOM	Distributed Component Object Module
DEA	Domain Enterprise Administration
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Service
EDSS	Enterprise Directory Synchronization System
EHLLAPI	Extended High Level Language Application Programming Interface
ECP	Extended Capability Port
EPP	Enhanced Parallel Port
FAT	File Allocation Table
FAT32	File Allocation Table 32-bit
HHSDC	Health and Human Services Data Center
GB	Gigabyte (1024 Megabytes)
GUI	Graphical User Interface
IBM	International Business Machines Corporation

IDE	Integrated Drive Electronics
I/O	Input/Output
IP	Internet Protocol
IPSec	Internet Protocol Security
KB	Kilobyte (1024 Bytes)
Kbps	Kilobits per second
LAN	Local Area Network
LIS	License Information System
MAN	Metropolitan Area Network
MB	Megabyte (1024 Kilobytes)
MCSE	Microsoft Certified System Engineer
MEDS	Medicare Eligibility Determination System
Mbps	Million Bits Per Second
NAP2K	Network Auto installer Program for W2K
NAV	Norton Antivirus
NetBEUI	NetBios Extended User Interface
NIC	Network Interface Card
NOS	Network Operating System
NTFS	New Technology File System
ORN	Online Release Notes
USB	Universal Serial Bus
PCOM	Personal Communications
PDF	Portable Document Format
PS/2	Personal System/2
RACF	Resource Access Control Facility
RAM	Random Access Memory
SAS	Statistical Analysis System
SQL	Structured Query Language

SVGA	Super Video Graphics Array
TCP/IP	Transmit Control Protocol / Internet Protocol
TSO	Time Sharing Option
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter
VPN	Virtual Private Network
WAN	Wide Area Network
WBT	Web Based Training
WINS	Windows Internet Naming Service

Appendix 2: Applications Settings Information

The configurations of the selected software applications are described in this appendix. Included are the installation options, application versions, and other information.

All applications are installed using the manufacturer's default installation options unless otherwise specified. The information provided below is primarily a list of the exceptions to the default options for each software package's installation. At times, the defaults will also be listed (and noted that they are, in fact, the defaults) simply to confirm those settings.

Windows 2000 Professional

Release Version: 2000

What and how to Install	Windows 2000 should be installed from and booted from the CD-ROM so that partitions can be managed. There are a number of places where prompts are made for information or other interaction from the architect. Below are the settings that should be chosen: • Delete any existing partitions on the hard drive • Create a single 3-GB partition. • Choose to format the partition using NTFS for file security on the workstation When prompted for specific information, enter "Name" in the *Name* field, "Org" in the *Organization* field, "Default" in the *Computer Name* field, and do not enter a password. All these settings will be changed later in the process. At the end of the installation, mark the *User's must enter a name and password to use this computer* option to ensure security by requiring each user to log on.

- After installation, do the following:
  - Clear the option to *Show this screen on startup*
  - Delete the *Connect to the Internet* icon from the desktop.

Windows 2000 Professional Service Pack 4

Release Version: SP-4

What to Install	Default installation, except deselect the option to back up the old files, as they take up disk space. Do NOT make a backup of the replaced files for this installation.

MS Office 97 SR2

Release Version: SR2

What to Install	Only install the following (instead of the defaults): Excel, Word, PowerPoint, Data Access, Office Tools, Converters and Filters
Custom Installation	Customize each of these tools/applications per the following tables.

Custom Setup

MS Office 97 Product	Options

MS Word:	• MS Word Program Files: Default (ALL)
	• Help: Default (YES)
	  ○ Help for MS Word
	• Wizards and Templates: YES
	  ○ Memos
	  ○ Reports
	  ○ Letters
	• Proofing: Default (ALL)
	• Address Book: Default (ALL)
	• WordMail: Default (ALL)

Excel:	• MS Excel Program Files: Default (ALL)
	• Help and Sample Files: Default (YES)
	  ○ Help for MS Excel
	  ○ Sample Files
	• Microsoft Map: Default (NO)
	• Spreadsheet Templates: YES
	  ○ Expense Report
	• Add-Ins: YES
	  ○ Analysis ToolPack
	  ○ Auto Save
	  ○ File Conversion Wizard
	  ○ Lookup Wizard
	  ○ Conditional Sum Wizard

MS Office 97 Product	Options
	• Spreadsheet Converters: ALL
Binder: NONE	

PowerPoint: Default	• MS PowerPoint Program Files: Default (ALL)
	• Content Templates: Default (YES)
	  ○ Typical
	• Design Templates: Default (ALL)
	• Help: Default (YES)
	  ○ Help for MS PowerPoint

MS Outlook 97: NONE	
Web Page Authoring: NONE	
Data Access:	• Database Drivers: ALL • MS Query: ALL
Office Tools:	• Office Assistant: ALL • Spell Checker: ALL • MS Graph: ALL • MS Graph Help: ALL • MS Info: ALL • Popular Clip Art: ALL • MS True Type: ALL • Find All Word Forms: ALL

Converters and Filters:	• Text Converters: YES
	  ○ Word 6
	  ○ Word 97
	  ○ Word 6 Export
	  ○ WordPerfect 5
	  ○ WordPerfect 6
	  ○ Recover Text
	  ○ HTML Converter
	• Graphic Filters: YES

MS Office 97 Product	Options
	○ TIFF ○ EPS ○ Windows BMP ○ Enhanced Metafile ○ CGM ○ PCX ○ WPG ○ Metafile ○ GIF ○ JPEG Kodak Photo CD
Getting Results: NONE	

Additional MS Office 97 Patches

Patch and Purpose	Special Installation Instructions
WordFix	Install the patch with all default settings.
PowerPoint Fix	Install the patch with all default settings.

Outlook 98

Release Version: 98

What to Install NOTE: Outlook 98 may not install correctly on large partitions. You may need to decrease the partition size to less than 10 GB.	Minimal Installation Import mail from “None” Choose the Corporate or Workgroup option.

Personal Communications

Release Version: 5.6

What to Install	ONLY Personal Communications (Not DB2 or Adobe)
Custom Installation	ONLY 3270 Emulation and Services Do not install any of the additional components

Internet Explorer

Release Version: 6.0

What to Install	Choose the minimal installation, as the only necessary option is the Browser. Install completely at defaults.

Adobe Acrobat Viewer

Release Version: 5.05

What to Install	Install the application with all default settings.

AT&T Global Dialer

Release Version: 4.27

What to Install	Default Installation
Custom Setup:	Business Acct Acct: CWSCC User ID: XCCSSUU Computer types selected: ▪ Web, e-mail , and other TCP/IP servers ▪ LAN Servers and printers Primary DNS: <automatically update> Secondary DNS: <automatically update> Primary WINS: <automatically update> Secondary WINS: <automatically update> Select the Modem, not parallel or Infrared Under Select a phone number, change the state to California, and select the Sacramento number. No, Connect later
Remove the icon from the desktop when done.	

Norton AntiVirus

Release Version: 7.61

What to Install	Install a default client installation of the application, choosing all defaults (or using the /s option with Setup if the SETUP.ISS file is current for a silent installation).

IBM Director

Release Version: 4.1

What to Install	Client installation
Select Components	Defaults: • Basic Services • NetFinity Directory Support • Web-Based Access • System Health Monitoring • Give the default workstation Administrator acct and password • Select Yes on all other options

NOTE: This should be performed AFTER the workstation has taken on a permanent name; in other-words, AFTER the workstation is delivered to the field. It is HIGHLY dependant on the workstation name, and if it is not done correctly, it will not work at all.

- The Client Installation option should be selected for this.
- All the default options from there should be accepted.
- When prompted for account information, it should be **Administrator** for the name, and the current workstation password for the password.

CICS Universal Client

Release Version: 3.12

Custom install using the following components:	Program Files ONLY
Other Options	• Deselect the option to *Install the client as a service* • Choose *Out of process* for the Com Object • Choose, *NO, I do not want to use Java*

Appendix 3: Workstation and User Policies

Following are the policy settings that should be implemented in the active directory for all counties utilizing the policy service offering. All policy settings are left at their default value unless listed below:

Workstation Policies

Administrative Templates	System -> Logon: • Run logon scripts synchronously • Run startup scripts visible

User Policies

Windows Settings
Internet Explorer Maintenance
	Connection Settings:
	• Enable Proxy Settings
	  ○ HTTP: 158.96.227.221
	  ○ PORT: 8080
	URL's:
	• Customize homepage to http://www.hwcws.cahwnet.gov
	• Delete Channels

Windows Settings Administrative Templates	Internet Explorer: • Disable Internet Connection Wizard • Disable Changing Connections Settings • Disable the connections page • Disable all scheduled offline pages • Disable Channel User Interface Start Menu and Task Bar • Disable and remove links to Windows Update • Disable Personalized menus Desktop: • Prohibit users from changing My Document path • Disable Active Desktop Control Panel: • Hide the Add/Remove Windows Component page • Disable Support Information • Hide the Screen Saver Tab Network: • Disable user configuration of offline files • Disable "Make Available Offline"

	System: • Don't display welcome screen at logon • Run logon scripts synchronously • Run logon scripts visible • Enable Group Policy and set refresh interval for users to 720 with a randomizer of 10